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The Efficacy of temporal unanticipated/anticipated questions within a mock translated interview: A tool to detect deceit?

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1.0 Abstract

This study examined the efficacy of the Unanticipated/anticipated cognitive load deception detection technique, within a translated interview. Research on the unanticipated questions technique has shown it can create observable differences between liars and truth tellers. Specifically, the amount of spatial, temporal and perceptual details produced, with liars producing less than truth tellers. The technique relies upon an increase in cognitive load to negate a liar's ability to create a credible lie. However, this ability to negate liars' production of a credible lie, may be reduced if liars can reduce their cognitive load, within a translated interview, through having a greater knowledge of the domestic interview language, than they are revealing. 39 English speaking participants were allocated to either a lying or truth telling cognition and then interviewed in Welsh, with an interpreter to translate into English. Whilst 20 Welsh/English speakers were also split into either lying or truth telling conditions. The interviews used unanticipated questions to induce cognitive load. They were then transcribed and coded for spatial, temporal and perceptual details. This study hypothesised that a) bilingual participants would provide a greater amount of spatial, temporal and perceptual details than monolingual and b) that truth tellers would provide greater amounts of spatial, temporal and perceptual details than liars. The results of this study suggest the effect of veracity had no significant result upon the amount of temporal, spatial and perceptual details produced. Secondly, the effect of condition partly supported the hypothesis, in that bilingual participants provided a significantly greater amount of temporal details than monolingual participants. However, they did not provide greater spatial or perceptual. Finally, a correlation between interviewer and participant self-report ratings. This suggested a significant relationship between the preparation/feelings of greater preparation and truth telling. These results suggest that the application of cognitive load, may have been too great and warrants further study as to the exact amount of cognitive load needed.

Key Words: Deception, Cognitive load, Working memory

2.0 Introduction

Lying can be defined in several ways, such as, the intentional act to deceive, to conceal the truth or the ability to cause an individual to believe something is true, that is in fact not. These examples in themselves may not be a negative or harmful act. Furthermore, Lewis, (2015), suggest lying is integral to everyday life and is a social tool needed to navigate life. Which means the negative bias around lying is not always correct, such as little white lies. However, the context of the intent is key to whether a lie is harmful or not. For example, Montgomery, (2017) suggests deceit at various organisational levels had a serious impact upon the United States of America's decision to invade Iraq in 2003, which had serious and harmful consequences for citizens from both nations. Whilst, Yin & Weber, (2015), suggest that an act of deception is morally good, if the act as a whole produces greater benefit to an individual or group, than the deceit causes. This means that lying can be used to intentionally cause harm to individuals, as well as being used as a tool for good. Therefore, this means it is important to strengthen research in the detection of deceit, to be able to protect those that may be harmed by intentional harmful deceit.

Thus, the present study will aim to strengthen current deception detection research by using the cognitive load unanticipated/anticipated deception detection technique to attempt to create observable differences between liars and truth tellers, in a mock translated interview. Furthermore, the use of temporal unanticipated/anticipated questions will provide a specific questioning technique, to cause observable differences in temporal details between liars and truth tellers (Vrij, 2014). This study will finally explore how this technique is affected in translated interviews, if an interviewee has a greater knowledge of the domestic language during the mock interview. This is due to the possibility of a reduction in cognitive load, if they understand the initial question in the interview, and then have the translated question. Which in turn will reduce cognitive load, because of the extra time allowed to the interviewee (Risko & Gilbert, 2016). However, to achieve this, an understanding of the underlying theoretical framework is needed, which is lacking in current research. Therefore, this study will suggest a theoretical framework of the cognitive load temporal unanticipated/anticipated question deception detection technique.

2.1 Deception in future intentions

Deep et al., (2018), suggest that liars attempt to anticipate credibility assessment questions by creating an alibi and rehearsing questions that may be asked. They create an alibi as a strategy to appear truthful by reducing the probability of having to answer a question spontaneously. Therefore, creating an honest impression to the interviewer is crucial to liars' ability to counter credibility assessments. However, previous deception detection research has concentrated on past events. For example, questioning a suspect on a burglary they have committed. However, Warmelink, Vrij, Mann & Granhag, (2012), suggest that liars also prepare alibis for future intentions, such as planning a terror attack. This is important because the strategies to detect deception for future intentions differ compared to that of past events. For example, Giolla, Granhag & Liu-Jonsson, (2013) suggest interviewing participants about their future intentions, created greater details of good planning from truth tellers and lesser details of good planning from liars. Whereas interviewing an individual that has committed a past offence and attempting to quantify the amount of behaviours that are indicative of good planning would be futile, because they are talking about a past offence. Therefore, this dissertation will focus on strengthening deception detection research on future intentions. It will achieve this by attempting to create an observable difference in

behaviour between liars and truth tellers during a mock translated interview about their future intentions.

2.2 Past deception detection techniques

Past deception detection has focused on several areas to detect deceit. For example, Ekman & Friesen, (1969)'s study suggesting that clues to deceit could be revealed through a term they deemed "Facial Leakage". This was because they suggest that body language and specifically certain facial expressions can be a sign of deceit. For example, they suggest the covering of a mouth, whilst recalling an event, may suggest deceit. However, research on non-verbal cues to detect deceit is at best inconsistent. Which is supported by Vrij, Akehurst & Knight, (2010), when suggesting common held beliefs about deception cues by the public often include non-verbal behaviour. However, they go on to suggest that firstly no theoretical basis exists to support this and secondly, that the literature supporting non-verbal deception detection is not consistent. Which meant that alternative areas were explored, when attempting to create a scientific answer to deception detection. This is supported by Vrij et al., (2018) when suggesting that around a decade ago, research began to focus on verbal cues to deceit as a sign of deception. They further suggest that this is because verbal differences between liars and truth tellers, not only have greater reliability, yet also have a stronger relationship with deception. This is an improvement because it adds a degree of consistency to the literature. However, although verbal cues are an improvement on non-verbal cues to deceit, questionable verbal techniques have been developed. One such example is the Scientific Content Analysis (SCAN). SCAN is verbal deception detection technique, that analyses verbal statements. However, Bogaard, Meijer, Vrij & Merckelbach, (2016), suggest research on SCAN has a lack of inter-rater reliability. Which is an obvious weakness, yet an even greater weakness to SCAN is the lack of scientific theory. This means that although an improvement over non-verbal cues have been suggested, the lack of inter-rater reliability and lack of solid theory negate any improvement SCAN could offer. Therefore, this dissertation will suggest the use of a deception detection technique that will attempt to create verbal cues to deceit, with a theoretical grounding. It will attempt this by aligning itself with current deception research, in the form of the cognitive load technique.

2.3 Cognitive load deception detection technique

The cognitive load deception detection is one such technique that can achieve observable differences in behaviour. It relies upon lying being a cognitively greater demanding task, than telling the truth. Risko & Gilbert, (2016) suggest cognitive load is the amount of mental effort in use at any one time. For example, learning to drive involves concentrating on steering the wheel, whilst processing the external environment and manipulating the information, to react to a turn will increase the individual's cognitive load. Which is important because the increase in cognitive load, will decrease the individual's ability to perform alternative tasks, at the same time. Therefore, increasing a liar's cognitive load, will effect their ability to lie, because lying is already a cognitively demanding task. Furthermore, Maranges, Schmeichel & Baumeister, (2017) suggest that working memory ability is limited and that the greater the amount of cognitive load, the greater the difficulty to perform mental tasks become. This is important in relation to deception because increasing the cognitive load upon the already cognitively demanding task of creating a lie, should cause greater stress upon each of the components of working memory, because it has a finite capacity. Which in turn should create observable differences in behaviour between liars and truth tellers, because liars will find it more difficult to answer questions, as well as lie. Therefore, the cognitive load deception detection technique provides an ability to differentiate between liars and truth tellers. However, it is important to mention that cognitive load can be reduced.

Risko & Gilbert, (2016), suggest several ways to reduce cognitive load. However, in relation to this study, their mention of having greater amounts of time to complete a task is relevant. This is of greater importance to this dissertation because of the translated interview aspect. For example, if a suspect requests a translator for a police interview, yet understands the host language. They will then understand the initial question, whilst having time to create a lie during the translation. Whereas an individual who has to respond instantly, will not be able to reduce their cognitive load. Therefore, the suspect is able to create greater amounts of time to reduce their cognitive load. Which may reduce the amount of observable differences between liars and truth tellers, in a translated interview.

2.4 Cues to deceit - Observable differences

Increasing cognitive load to create observable differences can be achieved through several different means. Firstly, Evans, Michael, Meissner & Brandon, (2013), suggest asking the suspect to retell their story in reverse order will induce cognitive load. Whereas, Visu-Petra, Varga, Miclea & Visu-Petra, (2013), suggest to induce greater levels of cognitive load, a dual task, such as having the interviewee watch a video, whilst being questioned will achieve this. However, both of the previous techniques may arouse suspicions and counter strategies because neither are particularly subtle. Therefore, Pastore, (2012)'s suggestion of decreasing the amount of time to induce cognitive load, will arouse less suspicion. Once cognitive load has been increased, it is possible to detect the observable differences in behaviour, between liars and truth tellers. Sporer, (2016) suggested that observable differences can include appearing nervous, speech hesitations and speech errors. However, the reliability of these cues have to be questioned because firstly, many of Sporer's suggested cues to deceit were barely significant. Secondly, Drake, Gonzalez, Sigurdsson, Sigfusdittir & Gudjonsson, (2017), suggest appearing nervous and speech errors can be expected of both truth tellers and liars during interview, because of the intimidating nature of a police interview. This is important because the presence of anxiety has been believed to be a cue to deceit, yet the evidence is at best inconsistent and does not provide a theoretical framework as to why appearing nervous is a sign of deceit. Therefore, non-verbal cues, such as appearing nervous can be deceiving, when attempting to cause observable differences between liars and truth tellers. Which means an alternative measure is needed.

2.5 Spatial details, Perceptual details, Temporal details and Fillers

In spite of the unreliability of non-verbal cues, Nahari, Vrij & Fisher, (2012) suggest verbal cues of deceit may provide greater reliability between differences in statements of liars and truth tellers. This is important because Lancaster, Vrij, Hope & Waller, (2012), suggest the reality monitoring technique has provided a theoretical framework for differences between the details provided by liars and truth tellers. They suggest that lies are acquired through cognitive operations, whilst perceptual processes create true experiences. This is important because it now provides a significantly reliable and theoretical approach to truth telling behaviour, compared to that of liars. Therefore, the greater amount of perceptual processes, the greater the amount of truth. The perceptual processes are specifically referring to three details, temporal, spatial and perceptual. Nahari, Vrij & Fisher, (2012), suggest temporal, spatial and perceptual details, are able to distinguish between liars and truth tellers because truth tellers include greater amount of temporal, spatial and perceptual details when discussing future intentions. For example, if an individual includes "I was planning to travel to Cardiff bay rail way station", then they have provided a spatial detail. Which would indicate truth telling.

However, it is necessary to discuss the amount of perceptual processes needed to distinguish between liars and truth tellers. This is important because although Nahari, Vrij &

Fisher, (2012), have suggested that greater amounts of temporal, spatial and perceptual details are indicative of truth, they do not suggest the amount of details needed. In spite of this weakness in the literature, this essay will focus on maximising the differences between the amounts of details in truth tellers and liars, rather than the amount that are needed to suggest a lie in an individual. Therefore, inducing greater cognitive load upon a liar should increase the amount of verbal deception cues, when discussing future intentions. Which will mean a decrease in the amount of temporal, spatial and perceptual details, given by liars. Therefore, spatial, temporal and perceptual details provide this dissertation with a quantifiable unit, to measure differences between liars/truth tellers and monolingual/bilingual participants within a mock translated interview.

2.5 Unanticipated/Anticipated questions

As a result of discussing verbal differences between liars and truth tellers, it is now possible to discuss maximising the differences between the two. Roos af Hjelmsater, Ohman, Granhag & Vrij, (2012) suggest the unanticipated/anticipated (UA) questions technique seeks to maximise such differences by asking unanticipated questions. This is important because a truth teller will simply recall the memory, whilst a liar will have to create a lie on the spot, in response to the unanticipated question. For instance, an interviewer may ask who the interviewee was intending to meet as an anticipated question, and then ask what the order of events after meeting that person will be, as an unanticipated question. Sooniste, Granhag, Stromwall & Vrij, (2015) suggest that this is of great importance to the unanticipated question technique because liars prepare for questions on their intentions, however they do not prepare for questions on the planning of their intentions. Therefore, the UA technique maximises the difference between liars and truth tellers, through the exploitation of liar's lack of preparation about the planning of their intentions. Which in turn suggests truth tellers should provide greater amounts of temporal, spatial and perceptual details, when asked unanticipated questions, compared to that of liars.

However, although unanticipated questions have the ability to maximise the difference between liars and truth tellers. The importance of the type of questions is key to increasing the cognitive load upon interviewees. For example, Lancaster, Vrij, Hope & Waller, (2012) suggest asking the interviewee to draw the layout of a room will increase cognitive load on liars, because of the greater stress placed upon Baddeley, (2000)'s visuospatial sketchpad. This means the question is specifically related to the visuospatial sketchpad, which is a component of working memory that has responsibility for processing spatial details within the model. This is important because it increases the cognitive load of the visuospatial sketchpad. Therefore, increasing the difficulty for the interviewee to be able to create a lie based upon spatial details. As a consequence of their study this dissertation will specifically target liars' ability to construct false events, through the use of temporal based UA questions, as a tool to induce cognitive load during the mock translated interviews.

2.6 Episodic Future Thinking and Temporal questions

The selection of temporal UA questions is of even greater importance because of Episodic Future Thought (EFT). McDermott, Woolridge, Rice, Berg & Szpunar, (2016) suggest EFT is the ability to mentally construct potential future events. This is important because of a liar's previously mentioned lack of preparation in relation to planning, when lying about future events. Which means that they will rely on EFT to construct false future events. Which means an increase in cognitive load, through the use of temporal UA questions, specifically aimed at EFT will increase liars' difficulty in creating a lie that has a correct temporal order.

Which in turn may effect a liar's ability to provide temporal details, which further maximises the difference between the amount of temporal details produced by liars and truth tellers. Furthermore, Hill & Emery, (2013), suggest that EFT's ability to construct future events, is at least partly due to contributions from Baddeley, (2000)'s episodic buffer, which is a component of the working memory system. They go on to suggest several cognitive mechanisms that construct the ability as a whole. However, it is the relationship with the episodic buffer that is most important to this dissertation. This is important for two reasons, firstly, it provides a theoretical framework to the cognitive load deception detection technique.

Secondly, it provides a specific target to induce cognitive load during a lie. For example, Lancaster, Vrij, Hope & Waller (2012)'s suggestion of drawing the layout of a room to increase cognitive load on the visuospatial sketchpad, can be adapted to EFT's relationship with the episodic buffer. This can be achieved by instead, asking temporal unanticipated questions on the order of events, which will increase the cognitive load of the episodic buffer. Which in turn will at least partially disrupt EFT's ability to construct imagined future events, in the correct order. Thus, EFT's relationship with the episodic buffer and working memory, not only creates a theoretical framework based on working memory to the construction of future events. Yet, also provides a theoretical target, to focus cognitive load, during the interview. Therefore, in relation to this dissertation EFT is crucial to the construction of future intentions. Which in turn, means that temporal unanticipated questions targeted at the episodic buffer, will create observable differences (especially in the form of temporal details) between liars and truth tellers, because the increased, targeted cognitive load will disrupt the episodic buffer's ability to temporally construct imagined future events. Unless the individual can reduce their cognitive load, such as the use of extra time to create a lie. Which may be possible if the interviewee has a greater understanding of the host language in a translated interview. However, to understand how the cognitive load deception detection technique is applied, it is necessary to discuss the Working memory model in relation to lying.

2.7 Working memory

Creating temporal questions to induce cognitive load and cause greater stress on an individual's EFT is key to causing observable differences between liars and truth tellers. However, past research has lacked a theoretical framework when discussing exactly how this is achieved. For example, Vrij, Akehurst & Knight, (2006)'s suggestion that liars appearance of nervousness is a widely believed cue to deceit in the police. However, it lacks the ability to suggest why this happens, as well as being inconsistent with current literature on the appearance of nerves as a cue to deceit. Therefore, this dissertation will align itself with past cognitive load deception research, such as Sporer, (2016) by using the working memory model as a theoretical framework to induce cognitive load in the form of temporal unanticipated/anticipated questions. The working memory model is part of short term memory and controls linguistic, perceptual and conscious processing. Maranges, Schmeichel & Baumeister, (2017), support this by suggesting Alan Baddeley's working memory model is the brain's ability to concentrate attention, process the information and then manipulate the information.

This is important to deception research because without the ability to process current information into long term memory or for current use, then an individual's ability to create a lie would be severely impaired. Baddeley, (2000), suggested the working memory model as an alternative to the multi-store system and has several components. Firstly, the central executive has responsibility for selective attention, coordination of the other components

and prioritisation of incoming information. This is important because it is the only component that does not act as a memory store, but rather a controlling influence. Although the central executive controls these systems, Nyberg, (2018) suggest multiple smaller central executives may exist for each component. However, this does not disrupt the functions of the central executive in context to the other components. This is because Nyberg suggests a central distribution network still distributes external information and prioritises where the information is sent. Therefore, the central executive is important to the processing of information because it has control over the alternative components.

The next component is the visuospatial sketchpad. Simone, Bedard, Marks & Halperin, (2015) suggest that it is responsible for processing visual-spatial information. They go on to suggest that the visuospatial sketchpad processes two types of visual information because of the different pathways in which the information is processed. Firstly, the ventral stream processes visual objects, including the size, colour and any defining objects. Whereas, the second visual information processed is spatial details in relation to the individual, such as room layouts and where the individual is within that room. It is processed by the dorsal stream and is important because being able to process where an individual is in relation to a corridor, then being able to process the lay-out of a corridor means the individual is able to make decisions based upon the external environment, such as a closed door. Then the individual would not be able to describe how an individual could walk through a corridor. Therefore, the visuospatial sketchpad has an important role in human ability to process and understand visual information from the environment. Which is key to strengthening an alibi because it strengthens the appearance of credibility.

The Phonological loop is the third component and has responsibility for processing external phonological influences. Papagno et al., (2017) suggest the phonological loop is able to process information by firstly storing it in the phonological store (a short-term memory store). However, information held in the phonological store is open to rapid decay. This is where the second component of the phonological loop is needed, the articulatory loop is able to rehearse the verbal information and prevent the information from decay. For example, verbally rehearsing the digits of a phone number will increase the likelihood of memory retention because of the transfer from the phonological store, to the articulatory loop. Therefore, the previously mentioned components of Working memory are crucial to adding relevant context to a lie, because of their role in processing the immediate environment. However, the missing ability to create a temporally correct sequence was a weakness of the Working memory, until Baddeley revised the model.

2.8 The Episodic buffer

The final component was added in 2000 by Baddeley and is called the episodic buffer. Patros, Alderson, Hudec, Tarle & Lea, (2017) suggest this component was added after failing to explain several experiments with long term amnesiac patients. They further suggest that this component has responsibility for chronologically ordering information from the other components. Which is supported by Hill & Emery, (2013)'s previously mentioned suggestion during the discussion of EFT, that the episodic buffer was crucial to chronological ordering in EFT. Moreover, the episodic buffer's abilities are important when reacting to external influences. For example, a delay in visual information processing, with a normal functioning phonological processing, when speaking to two strangers, may confuse the individual as to which person had spoken. However, the role with greater importance within deception research is suggested by, Baddeley, Allen & Hitch, (2011), when they suggest the second responsibility is the interaction role with long term memory. This means the ability to create

a lie from past experiences (long term memory) may be disrupted, if cognitive load is increased.

This is specifically important to an individual's ability of the construction of a lie because without this ability, any alibi created may not make sense chronologically. In turn this would create suspicions about their intentions, if attempting to appear credible. Therefore, in relation to creating a credible alibi, all components of the working memory are important, because they play an integral part between how external influences are processed and then how the brain is able to react to these influences. Although, the episodic buffer is of greatest importance to the appearance of credibility, because of it's ability to chronologically construct information, to create a credible alibi. Therefore, this dissertation will target the episodic buffer's ability to contribute to EFT's ability to chronologically construct future events, through the use of temporal based UA questions. Which means liars should provide less temporal, spatial and perceptual details because of increased cognitive load. Furthermore, the specificity of temporal questions mean that an even greater difference should be presented between liars and truth tellers, when providing temporal details. However, the extra time allowed to a liar during a translated interview, if they can understand the host language, may reduce the cognitive load. Which in turn may increase the amount of temporal, spatial and perceptual details the liar could provide. Which in turn will have repercussions for current police procedure.

2.9 Current legislation and translated interviews

Although the cognitive load deception detection technique provides a reliable and theoretically driven technique. Literature has not considered the applicability effects during translated interviews. In spite of this, Ewens et al., (2014) is one such study that has questioned the effect of interpreters on eliciting information and cues to deceit. However, their study focused on if the mere presence of a translator could cause a difference in the amount of details solicited. Whereas this dissertation builds upon Ewens et al's study by repeating the translated interview, yet changing the focus to the interviewee's ability to create a lie, rather than the presence of the interpreter effecting the amount of verbal cues presented. This is important because the Police and Criminal Evidence Act, (1984) (PACE), states an interpreter must be appointed, if the interviewee is not able to understand English. Which has repercussions for the efficacy of translated interviews, due to the suspect's potential ability to reduce their cognitive load, if they have a greater understanding of the host language, than they are revealing. For example, if the technique relies upon Pastore, (2012)'s previous suggestion of shortening the amount of time a liar has to prepare a lie to induce cognitive load. Then the cognitive load will be negated. This is especially true of UA questioning because it relies on liars not having prepared to answer the unanticipated questions, to be able to cause observable differences. Therefore, the extra time allowed to a liar in a translated interview, if they understand the host language, will create extra planning time and negate the increased cognitive load. Which in turn, may increase the amount of spatial, temporal and perceptual details a liar is able to produce in a translated interview.

Further repercussions for the Counter Terrorism & Security Act, (2015) are now apparent, because if bilingual liars are able to negate the effects of cognitive load during a translated interview, when lying about their intentions. Then serious ramifications for security arise, because of the possibility of negating the cognitive load deception detection technique. To contextualise this, Dodd & Travis, (2017), suggested that the recent Manchester bombing may have been prevented, if information that had been deemed irrelevant, had been acted upon. Although the attacker was a born in the UK and spoke English. This highlights the fine

lines between truth and deception that the intelligence agencies are having to make judgements on. However, a more specific example to translated interviews is stated by the BBC, ("Mosque bomber given life for murder",2013) when reporting that a Ukrainian nationalist firstly murdered an elderly man, after the elderly man was returning from prayers at his local mosque. The attacker then planted three bombs and was arrested by the police. However, the details surrounding the bombs may not have been revealed, if the the attacker had an advantage during the interview, in the form of reduced cognitive load.

Which is especially important, when considering the rise in terrorist and hate crimes within the UK (Home office, 2017). However, of even greater importance is the ability the attacker had to request an interpreter, which in turn may have increased his ability to cause harm. Thus, giving the attacker the ability to reduce their cognitive load. Therefore, strengthening research to either elicit information or detect deceit about future intentions, is crucial to counter-terrorism within the UK.

2.10 Rationale

An appeal for further research on the affect of the presence of an interpreter in translated interviews has been stated by Vrij et al., (2018). Which this study intends to comply with, however, this study's focus will attempt to build on Vrij et al, by focusing on the cognitive mechanisms behind a liar's ability to produce spatial, temporal and perceptual details. Therefore, the rationale for this study is that current research on anticipated/unanticipated questions has not questioned the efficacy of the technique upon a liar's ability to create spatial, temporal and perceptual details within a translated interview. This is because, if a liar has an advantage because of greater understanding of the domestic language than they are stating they have, then they will be able to reduce their cognitive load during interview. Therefore, having the ability to create greater amounts of spatial, temporal and perceptual details.

Furthermore, the need to provide a solid theoretical framework to the literature is vital to firstly understanding the underlying cognitive mechanism, yet also to be able to create theoretically valid counter measures to a liar's strategies. Therefore, this study will provide a theoretical framework to the cognitive mechanisms, during interview.

Finally, this research is of even greater importance, because of the potential repercussions that may arise from a liar that is able to produce as many spatial, temporal and perceptual details, as a truth teller in a translated interview. For example, Katersky, Margolin, McPhee & Ross, (2018), report that an attacker that killed eight individuals in New York, with a vehicle attack in 2017, was not only previously known, yet previously interviewed about his links with extremism. Which means either signs of the attacker's true intentions were misdiagnosed, or that the attacker was not deemed a risk. Either cause suggests that strengthening deception research on future intentions, is vital to counter-terrorism in the modern world.

3.0 The present study

Having discussed the need to strengthen deception research within a translated interview. This study will align itself with previous research on translated interviews (Vrij et al., 2018) by researching the amount of spatial, temporal and perceptual details produced by liars and truth tellers. The first aim of the study is to suggest a theoretical framework to the cognitive mechanism of deception within translated interviews, through theories such as the Working memory model (Baddeley, 2000), Episodic future thought (Szpunar, 2010), and Cognitive Load theory (Sweller, 1988). However, no study has yet researched the efficacy of the interview techniques within a translated interview, if a suspect has a greater knowledge of a domestic language, than they are revealing.

Therefore, the primary aim of this study is to research the efficacy of unanticipated questions within a translated interview, if a suspect has greater knowledge of the domestic language, than they are revealing. Part of increasing the efficacy of unanticipated questions within a translated interview, is to increase the methodology. Thus, an improvement on previous studies is the use of the Welsh language as a domestic language. This provides two improvements, firstly, because the participant's response is in English, no loss of meaning or subtleties will be caused by translation during coding (Vaismoradi, Jones, Turuneb & Snelgrove, 2016). Secondly, the English speakers provide a condition that is completely naive to the domestic language. Therefore, providing a comparison between those that have a greater understanding of a domestic language and those that do not. The mock translated interviews will be in accordance with PACE regulations. Which means the interviewer will question in Welsh, followed by a translation into English. Whereas the interviewee will answer in English, followed by a translation into Welsh. Finally, the amount of spatial, temporal and perceptual details will be coded from transcriptions of the translated interviews. This will provide a measure to be able to discriminate between liars and truth tellers. Which in turn will be able to provide a measure between monolingual liars and bilingual liars, to assess an advantage, if any exists.

3.1 Hypothesis

This study therefore hypothesises that either truth telling or having a greater knowledge of a host language, will decrease the application of cognitive load, through the form of Unanticipated/anticipated questions within a translated interview. Specifically, this study hypothesises that a) bilingual participants will produce greater amounts of spatial, temporal and perceptual details, than monolingual participants. Secondly, that b) truth tellers will produce greater amounts of spatial, temporal and perceptual details, than liars.

Finally, additional dependent variables in the form of participant and interview ratings of comfort, speed, preparedness and co-operation are included in this study because of the need to add greater understanding to the process of translated interviews. However, no specific hypothesis will be included for these variables.

4.0 Method

4.1 Design

The design of this experiment was a 2 x 2 between subjects study. The independent variables (IV) were firstly, whether the participant was in a lying or truth telling condition and secondly, whether the participant was monolingual (English speaking) or bilingual (English and Welsh speaking). Therefore, participants were allocated to one of four conditions, Welsh speaking liars, Welsh speaking truth tellers, English speaking liars or English speaking truth tellers.

The dependent variable (DV) was the amount of perceptual details, spatial details, temporal details and fillers provided during the interview. This was measured through the recording of their replies during interview. The interviews are then transcribed and coded for perceptual details, spatial details, temporal details and fillers, thus providing a measurable variable.

4.2 Participants

The number of participants used was 59 with a mean age of 28.88. 25 males participated and 34 females participated. English speakers were recruited through opportunity sampling at the University of South Wales. Welsh speakers were recruited through both opportunity and snowball sampling. This was because bilingual participants were of greater difficulty to obtain. An advertisement was placed on the University of South Wales website, which led to several participants recruited from an opportunity sample. Whereas a Welsh speaking participant led to several volunteers from a Welsh speaking group in Yr Llyfrgell and the remaining volunteers at the participants employment, Menter Caerdydd. Therefore, bilingual participants were asked if they knew other Welsh speaking individuals available to take part in the study, which led to the snowball sampling.

4.3 Extraneous variables

Several extraneous variables were controlled for. Firstly, a Welsh language ability test was created to ensure participants Welsh language ability was at an appropriate level to understand the complexity of the questions during interview. Whilst the Welsh language test was also able to ensure English speakers Welsh language ability was low enough, to ensure they could not understand the questions in Welsh. The Welsh language test was important due to Welsh having a dual status with English within Wales (Welsh Language Act 1993, 2018) and pupils having to learn Welsh up to the age of fourteen. Therefore, the test controls for Welsh language ability.

The second extraneous variable was Counterbalancing of the Strategic Use of Evidence (SUE) technique and the Unanticipated/Anticipated (UA) technique. The techniques were counterbalanced to ensure questions from the initial technique, were not reducing the efficacy of the latter technique. For, example one of the unanticipated questions may have effected the SUE's ability to present contradicting evidence. However, the experimental procedure did include the SUE technique due to the inclusion of another student's dissertation. Although, it is important to note that the effects of the SUE technique is of no importance to this study, because of it's focus on the UA technique.

The final extraneous variable considered was the language of the coding for perceptual, spatial and temporal details. This is important because past research of deception techniques and translated interviews have held interviews in English, then translated into a foreign language and answered by the interviewee in a foreign language. Which means the details provided by the participant have to be translated back into English. Therefore, there is a possibility of perceptual, spatial and temporal details changing during translation. However, because the interviews are held in Welsh, translated to English and then answered in English. The loss of meaning during translation is no longer an extraneous variable.

4.4 Materials:

There are three categories of materials used in this experiment, which will be listed beneath. Their use in the experiment will be specifically referred to during the procedure section of this report.

Paper materials

- Brief and debrief sheets (appendix. 1 & 2)
- Liars' mission (appendix. 3)
- Truth tellers' mission (appendix. 4)
- Liars' update (appendix. 5)
- Truth tellers' update (appendix. 6)
- Map of Cardiff bay (appendix. 7)
- UA questions relating to mission (appendix. 8)
- SUE questions relating to mission (appendix. 9)
- Post interview participant questionnaire (appendix. 10)
- Post interview interviewer questionnaire (appendix. 11)
- Welsh language ability assessment (appendix. 12)
- Consent form (appendix. 13)

Device materials

- Recording device

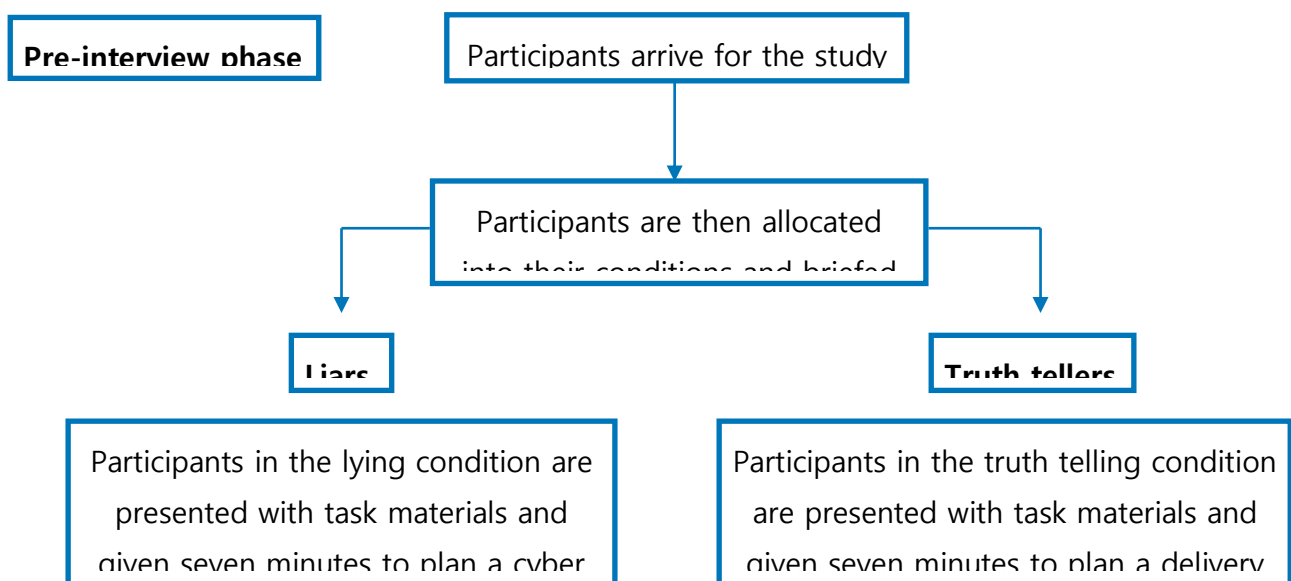
Experimenter materials

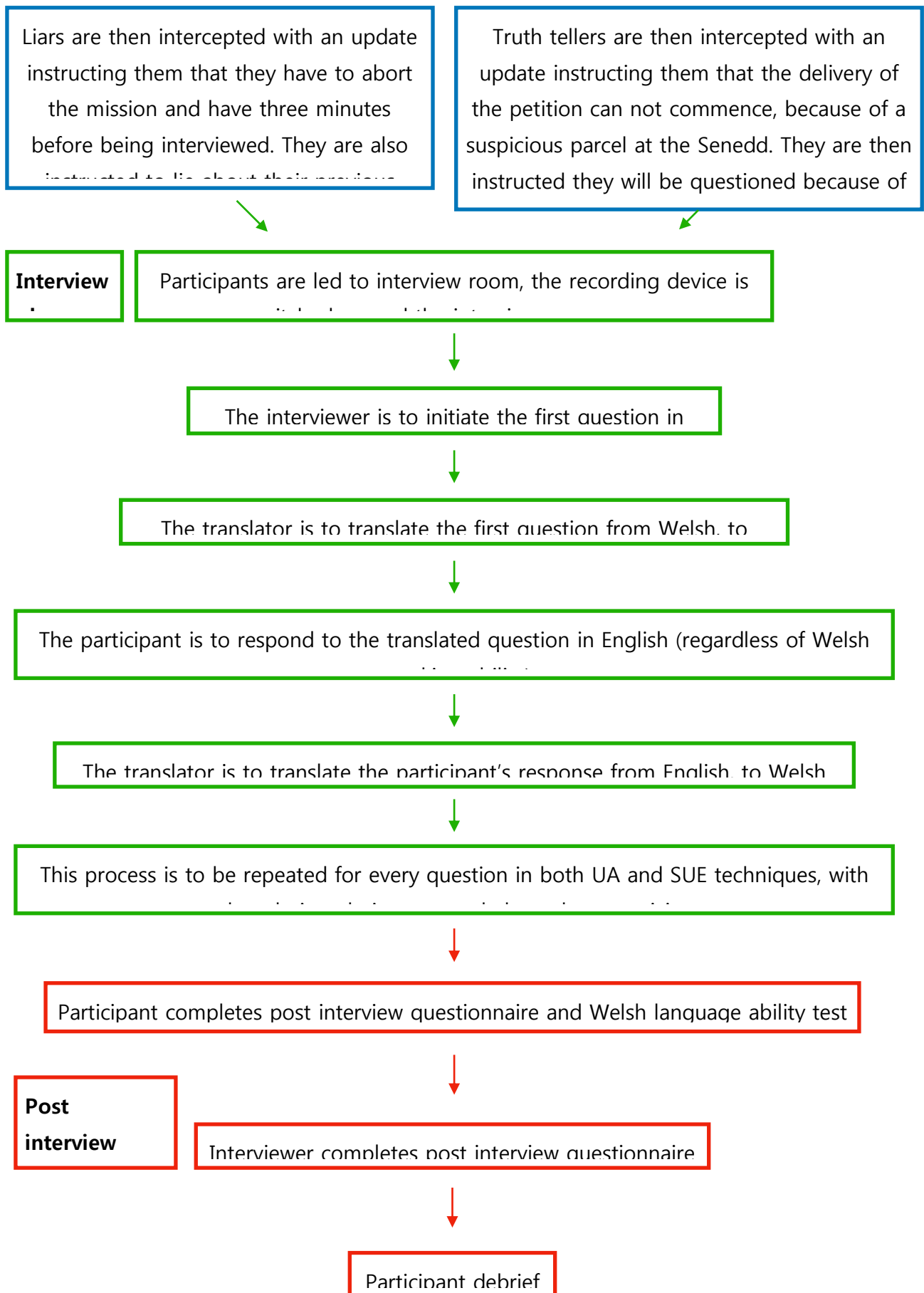
- Welsh speaking interviewer
- Welsh speaking translator

4.5 Procedure:

The following diagram (Figure. 1) will provide an example of the experimental procedure, followed by the discussion of greater detail, post diagram.

Figure 1 - Diagram of the experimental procedure of the experiment





4.6 Pre-interview phase

The experiment is split into three phases, the pre-interview (brief), the interview and the post interview (debrief). Firstly, the experiment is to commence with the pre-interview phase, which includes the participant receiving the experimental brief (appendix. 1). The participant then receives either the liar's mission brief (appendix. 3) or the truth teller's mission brief (appendix. 4), regardless of Welsh language ability. This is because both monolingual and bilingual participants will be allocated to either the lying condition or truth telling condition. Participants then have seven minutes to learn details of the scripts and plan a route to the Senedd with the accompanying map of Cardiff bay (appendix. 7). The truth teller's brief instructs the participant that they have been selected to deliver a petition to the Senedd. Whereas, the liar's brief, instructs the participant that they have been selected to carry out a secret task, in which they need to instal software on a target's computer in the Senedd, in order to gain information about possible interference in the European referendum vote. Both liars and truth tellers are instructed to plan their route from the Cardiff and Vale college to the Senedd, via Cardiff bay railway station.

After seven minutes of planning, both lying and truth telling conditions will be updated with their respective mission updates. The truth tellers update (appendix. 6) will be instructed that a suspicious parcel has been discovered at the Senedd and anyone expected there that day, will need to be interviewed. Finally, it is stressed that the truth tellers have done nothing wrong and should try to answer as truthfully as possible. However, the lying participants will now be updated and instructed that the mission has been compromised and that they will be required to participate in an interview. They are then instructed not to divulge any of the information of their mission, because there may be a later opportunity to return to the mission. They are finally instructed that they should state their intention was to visit the senedd to deliver a petition, which matches the truth telling condition. Therefore, the truth teller's statements and the liar's cover story should present a similar alibi, before entering the interview. However, the liars will have had significantly less time to create a credible story.

4.7 Interview phase

The next phase of the procedure is the interview phase. This is where the participant is to be interviewed by the interviewer in a mock translated interview, where Welsh is the domestic language and English is the foreign language. Whereas the translator will translate between participant and interviewer, to ensure ecological validity. Therefore, both interviewer and translator need the ability to speak Welsh, as the interview will be carried out in Welsh.

This phase is also important due to the counterbalance of the presentation of order between UA and the SUE questions amidst each participant. For example, participant 1 from the Welsh liars condition will receive the UA questions and then the SUE questions. Whereas participant 2 from the same condition will receive the SUE questions and then the UA questions.

Once the counterbalance order has been established, the interviewer is to start the recording of the interview and then begin either the UA or SUE questioning in Welsh, whilst the translator then translates the question into English. The participant is then to respond in English (regardless of if they have the ability to speak Welsh) and the translator is to translate the participant's response into Welsh, to increase the ecological validity of the

interview. This set structure for each question asked is important to ensure the participant's answer is recorded in English. This is important because the transcription and coding of the participant's response to questions, will not lose any meaning. Once the initial set of questions (UA or SUE) have been asked, the next set of questions is to be presented to the participant. Therefore, ensuring all questions from both techniques have been asked. The participant is to be thanked for participation and the recording turned off.

4.8 Post interview phase

The third phase of the experiment involves both the participant and interviewer filling out their respective post interview questionnaires (appendix. 10 & 11). The interviewer is asked to complete the post interview interviewer's questionnaire, which includes ratings on the interviewer's perceptions of how comfortable, how prepared, how quickly and how co-operative the participant was. The participants' questionnaires ask the same questions as the interviewer's questionnaire, yet this time it focuses on the participants' perceptions of their comfort, preparedness, speed and co-operation. The participants are also asked to complete the Welsh and English language ability to ensure their Welsh language ability does not effect their understanding of the experiment. For example, a participant identifying as an English speaker, yet with a high level of Welsh understanding, may have a greater understanding of the question posed during interview, therefore reducing the cognitive load of the interview. Whereas a participant identifying as a Welsh speaker, yet scoring low on the Welsh language ability test may increase their cognitive load, during interview. Therefore, the Welsh Language assessment provides a tool to be able to assess participant's suitability for the experiment. Finally, the participant is fully debriefed (appendix 2) and thanked for participation.

4.9 Coding

The coding of Spatial details, temporal details, perceptual details and fillers were recorded through the transcribed interviews of participants. This is following on from research such as (Lancaster, Vrij, Hope & Waller, 2012, De Waele & Claeys, 2017) that use coding as an appropriate method for quantifying spatial, temporal and perceptual details. Therefore, each interview was transcribed for the English response of the participant, which is an improvement on previous research because no loss of meaning or subtleties occurred from translation (Vaismoradi, Jones, Turuneb & Snelgrove, 2016).

Temporal details were recognised as answers relating to a specific time frame such as 'ten minutes' or a temporal order such as 'after that'. Next spatial details were recognised as answers relating to a specific place, such as 'The Senedd' or relating to a details within a space, such as 'the stairs in the senedd', (which would count as two separate details because of the presence of the senedd and the stairs). Finally, perceptual details were coded for answers related to personal feelings such as 'I felt' or relating to metacognition for example 'I thought about lying'.

Finally, to ensure inter-rater reliability, an external coder rated a random sample of transcripts for spatial details, perceptual details, temporal details and fillers. A Pearson's correlation was performed and is reported below.

Table 1 - Inter-rater reliability

| | Inter-rater reliability |
|-------------------------|-------------------------|
| Spatial details | $r = .93, p < .001$ |
| Temporal details | $r = .86, p < .001$ |

| | Inter-rater reliability |
|--------------------|-------------------------|
| Perceptual details | $r = .43, p = .102$ |
| Fillers | $r = .909, p < .001$ |

Table 1 reports strong agreement between coders for spatial details, temporal details and fillers. However, a non-significant result for perpetual fillers is reported. This may be due to the random sample, producing a lower amount of perceptual details.

4.10 Statistical method

Several statistical methods were used post coding to analyse the experiment. This was achieved through the use of SPSS and an interval of $p > 0.05$ was determined to be the point of significance. Firstly, statistical tests were used to determine whether liars were self-reporting that they were lying and that truth tellers self-reported that they told the truth, which was conducted through a 2x2 Multivariate ANOVA. Secondly an independent t-test was used to determine whether Welsh speakers actually had a greater amount of Welsh speaking ability, than that of English speakers.

The third set of analysis used was a 2x2 MANOVA to test for the effects of condition and veracity on spatial, temporal and perceptual details. Another 2x2 MANOVA was then used to assess the effects of condition and veracity upon the interviewees' self-report ratings. Which included the participant's ratings of comfort, speed, preparedness and cooperation. A final 2x2 MANOVA assessed the effects of condition and veracity upon the interviewer's self-report perception of the interviewee's performance. Once again, reporting ratings of comfort, speed, preparedness and cooperation.

4.11 Ethical issues

An initial ethical issue was raised by the University of South Wales's ethics panel. They stated that the initial plan for the experiment, may have solicited significant illegal activity within the Senedd. However, this was ratified by reinforcing that this experiment was advertised and briefed/debriefed as a spy game. As well as ensuring the advertising and experiment itself conformed with the British Psychological Society Code of Ethics and Conduct, (2009). This led to ethical approval, which is available in appendix 14.

5.0 Results

5.1 Participant screening

One participant was discarded because they were an outlier on several variables. Whereas five participants had one variable replaced with the series mean due to being an outlier on one of the variables.

5.2 Manipulation check

A multivariate ANOVA was conducted as an initial manipulation check, to ensure that participants were following instructions in regards to truth telling and lying. Condition + Veracity were used as independent variables, whilst Participant truthfulness ratings and Interviewer truthfulness ratings were used as dependent variables. It reported a non-significant, although approaching significant result for condition $F(2,51) = 3.01$ $p=.058$, whilst reporting a significant result for veracity $F(2,51) = 22.47$ $p<.001$. Finally a non-significant result between condition + veracity is reported $F(2,51) = .29$ $p=.745$

Table 1 - Univariate results of participant and interviewer self-reported truthfulness ratings

| Variable | Condition | Veracity | Condition x Veracity |
|--------------------------|--------------------------|---------------------------|-------------------------|
| Participant truthfulness | $F(1,54)=.842$ $p=.363$ | $F(1,54)=35.373$ $p<.001$ | $F(1,54)=.499$ $p=.483$ |
| Interviewer truthfulness | $F(1,54)=6.103$ $p=.017$ | $F(1,54)=.061$ $p=.806$ | $F(1,54)=.001$ $p=.978$ |

Table 1 reports a significant result for a univariate effect of veracity upon participant truthfulness ratings and for the effect of condition upon interviewer truthfulness ratings.

Figure 1 - Mean interviewer ratings of perception of the participant

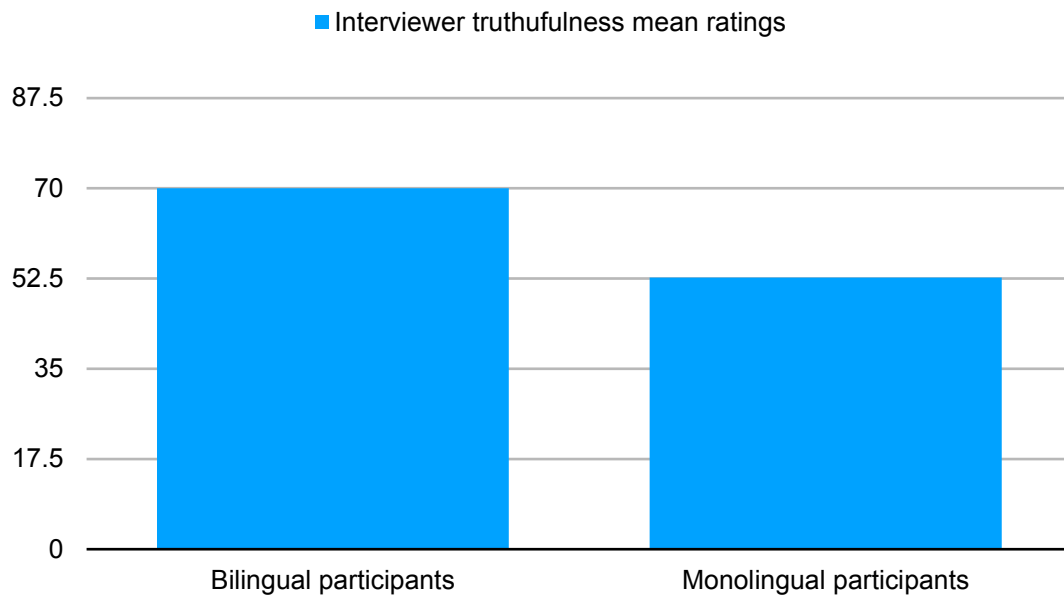


Figure 1 reports that interviewers perceived that bilingual participants were more truthful than monolingual.

Figure 2 - Mean participant self-report ratings of truthfulness

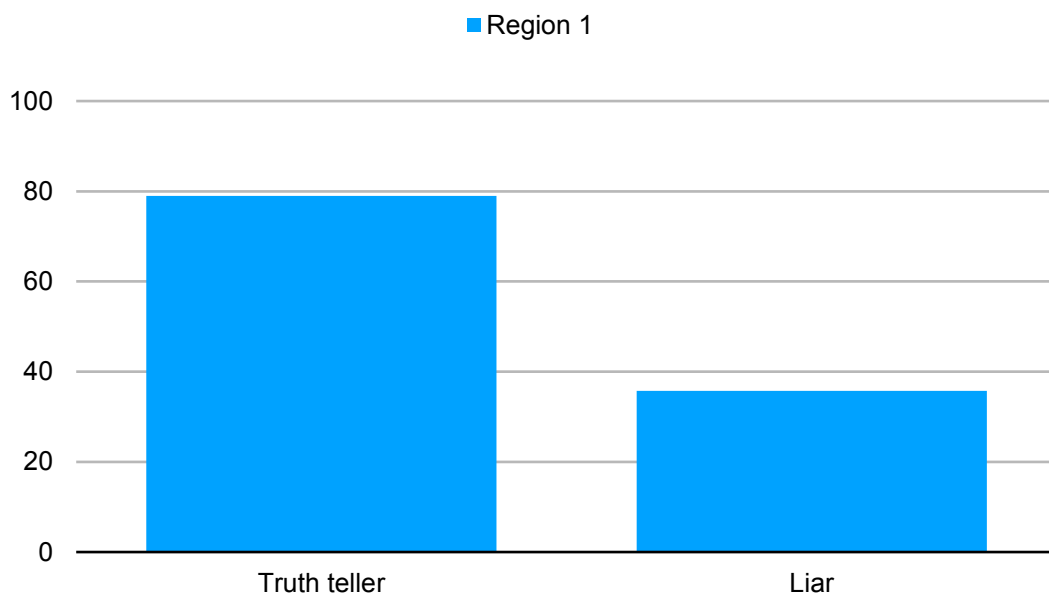


Figure 2 reported that truth telling participants reported a larger amount of truthfulness than liars.

Table 2.0 - Means and standard deviation of participant and interview truthfulness ratings

| | Welsh Liar | | Welsh Truth teller | | English Liar | | English Truth teller | |
|--------------------------|------------|-------|--------------------|-------|--------------|-------|----------------------|-------|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Participant truth rating | 42.72 | 30.03 | 80.00 | 24.03 | 31.17 | 28.91 | 78.50 | 21.58 |
| Interviewer truth rating | 70.91 | 32.38 | 69.00 | 24.69 | 53.52 | 23.70 | 52.00 | 22.84 |

| | Welsh speaking | | English Speaking | | Truth teller | | Liar | |
|--------------------------|----------------|-------|------------------|-------|--------------|-------|-------|-------|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Participant truth rating | 60.47 | 32.78 | 56.75 | 34.48 | 79.00 | 22.02 | 35.71 | 29.36 |
| Interviewer truth rating | 70.00 | 28.28 | 52.70 | 22.93 | 57.66 | 24.45 | 60.35 | 28.21 |

Table 2.1 - Means and standard deviation of participant and interview truthfulness ratings

The second manipulation check performed, was for Welsh language ability. An independent samples T-test reported a significant difference between the english speaking condition (M=2.51 & SD=4.54) and the Welsh speaking condition (M=50.57 & SD=11.12), $t(56) = -23.195$ $p < .001$ in Welsh language ability, with Welsh speakers having greater Welsh language ability.

5.3 Basic descriptives

Table 3 - A table stating the mean and standard deviations for dependent variables.

| Variable | Mean | Standard Deviation |
|--|------|--------------------|
| Participant - How well prepared to answer the questions posed | 3.39 | 0.94 |
| Participant - How co operative did you feel you were | 3.81 | 1.02 |
| Participant - How comfortable were you answering the questions | 3.63 | 1.18 |
| Participant - Do you feel you answered the questions quickly or slowly | 3.68 | 0.84 |

| Variable | Mean | Standard Deviation |
|---|-------|--------------------|
| Participant - What percentage truthful? | 58.10 | 33.63 |
| Interviewer - How well prepared to answer the questions posed | 3.72 | 1.10 |
| Interviewer - How cooperative did you feel they were | 4.17 | 0.88 |
| Interviewer - How comfortable were they answering the questions | 3.22 | 1.09 |
| Interviewer - Do you feel they answered the questions quickly or slowly | 3.70 | 0.83 |
| Interviewer - What percentage truthful? | 58.96 | 26.13 |
| Spatial details | 5.25 | 3.09 |
| Temporal details | 2.84 | 1.76 |
| Perceptual details | 0.28 | 0.52 |
| Fillers | 3.90 | 1.80 |

5.4 Perceptual, Spatial and Temporal details. Fillers.

A multivariate ANOVA was conducted with condition + veracity as dependent variables and spatial details, temporal details, perceptual details + fillers as dependent variables. Results revealed no significant multivariate effect of condition, $F(4,51) = 2.012$ $p=.107$, veracity, $F(4,51) = .856$ $p=.497$ and no significant interaction between condition + veracity, $F(4,51) = 2.134$ $p=.09$

Table 4 - Univariate results for the amounts of spatial details, temporal details, perceptual details and fillers.

| Variable | Condition | Veracity | Condition x Veracity |
|------------|--------------------------|--------------------------|---------------------------|
| Spatial | $F(1,54)=.742$ $p=.393$ | $F(1,54)=.258$ $p=.614$ | $F(1,54)=.634$ $p=.429$ |
| Temporal | $F(1,54)=4.716$ $p=.034$ | $F(1,54)=.951$ $p=.334$ | $F(1,54)=.224$ $p=.638$ |
| Perceptual | $F(1,54)=1.507$ $p=.225$ | $F(1,54)=2.781$ $p=.101$ | $F(1,54)=.8.224$ $p=.006$ |
| Fillers | $F(1,54)=.001$ $p=.089$ | $F(1,54)=.001$ $p=.997$ | $F(1,54)=.154$ $p=.696$ |

Table 4 states a significant result for the effect of condition upon the amount of temporal details produced. Figure 4 also states a significant interaction effect between condition + veracity.

Figure 5 - Mean amount of temporal details produced by bilingual and monolingual participants

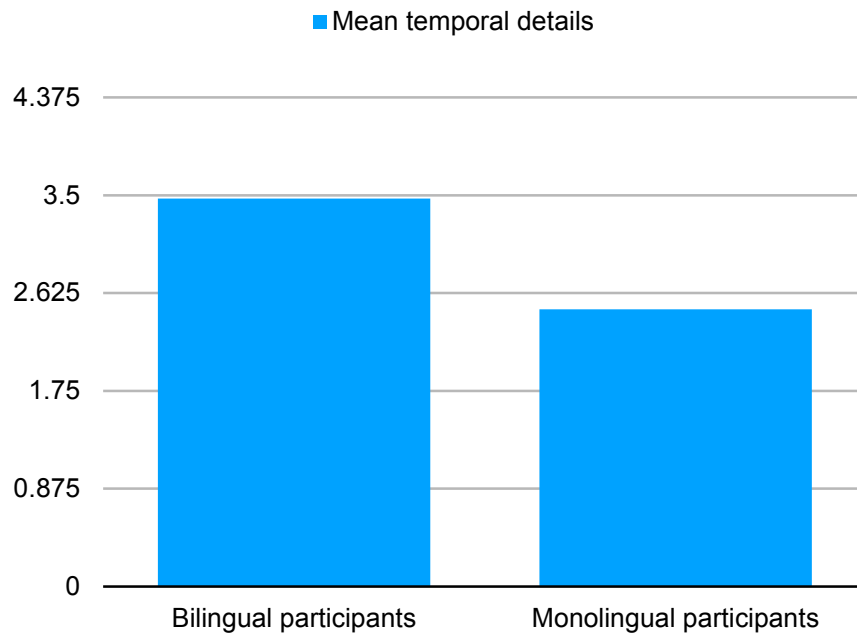
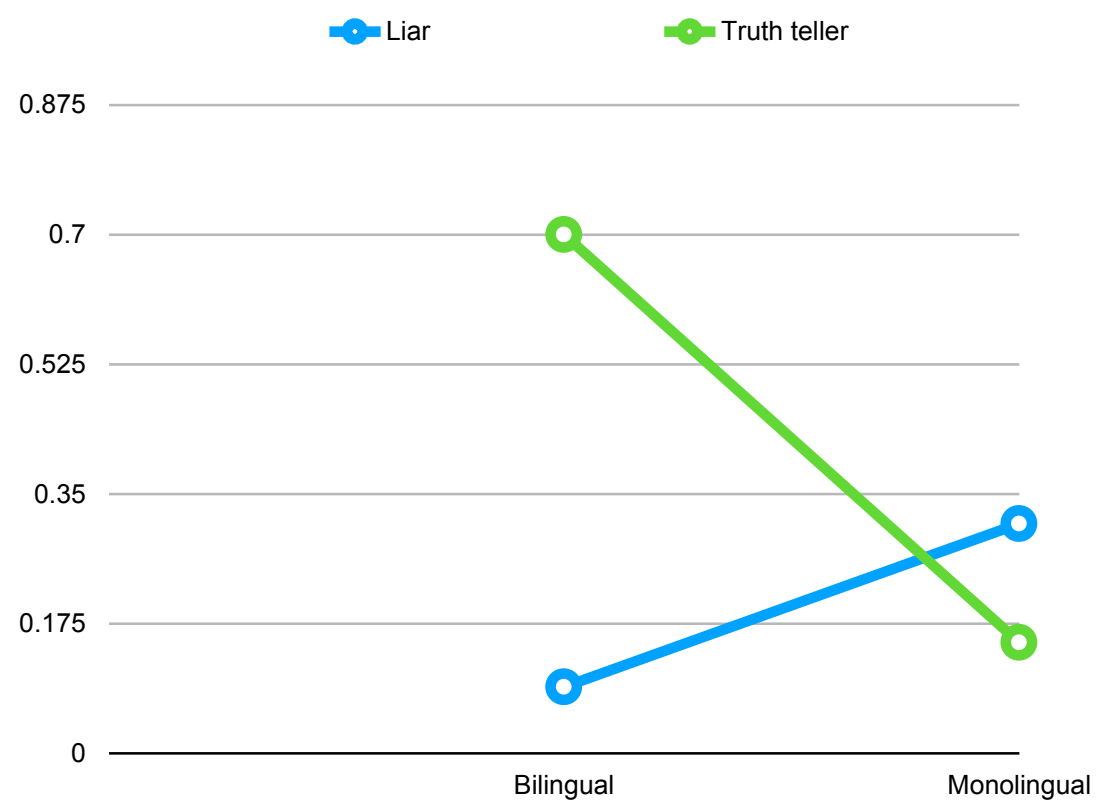


Figure 5 reports that bilingual participants provided a greater amount of mean temporal details than monolingual participants.

Figure 6 - Interaction of amount of mean perceptual details between condition + veracity

Figure 6 reports the significant interaction between condition + veracity and reports that



Welsh truth tellers produced the greatest amount of perceptual details and Welsh liars produced the least.

Table 5 - Means and standard deviations for spatial details, temporal details, perceptual details and fillers

| | Welsh speakin g | | English Speakin g | | Truth teller | | Liar | | Welsh Liar | | Welsh Truth teller | | English Liar | | English Truth teller | |
|--|--------------------|----|----------------------|----|--------------|----|----------|----|------------|----|--------------------|----|--------------|----|----------------------|----|
| | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD |
| | | | | | | | | | | | | | | | | |

| | Welsh speaking | | English Speaking | | Truth teller | | Liar | | Welsh Liar | | Welsh Truth teller | | English Liar | | English Truth teller | |
|------------|----------------|------|------------------|------|--------------|------|------|------|------------|------|--------------------|------|--------------|------|----------------------|------|
| Spatial | 5.71 | 2.79 | 4.99 | 3.25 | 5.35 | 2.68 | 5.14 | 3.52 | 5.18 | 2.92 | 6.30 | 2.66 | 5.12 | 3.94 | 4.87 | 2.62 |
| Temporal | 3.47 | 1.43 | 2.48 | 1.85 | 3.06 | 1.77 | 2.60 | 1.74 | 3.36 | 1.36 | 3.60 | 1.57 | 2.11 | 1.83 | 2.80 | 1.85 |
| Perceptual | 0.38 | 0.66 | 0.22 | 0.41 | 0.33 | 0.60 | 0.22 | 0.41 | 0.09 | 0.30 | 0.70 | 0.82 | 0.31 | 0.46 | 0.15 | 0.36 |
| Fillers | 4.44 | 1.24 | 3.58 | 2.01 | 3.84 | 1.77 | 3.96 | 1.86 | 4.36 | 1.20 | 4.54 | 1.34 | 3.70 | 2.19 | 3.49 | 1.89 |

5.5 Correlations between Welsh language ability and perceptual, spatial and temporal details

A correlation was computed between self-reported language score + type of details for liars + truth tellers separately.

For liars, no significant correlation was reported between Welsh language ability + Spatial details, $r(26) = .118$ $p = .551$ perceptual details, $r(26) = .206$ $p = .293$ and Fillers $r(26) = .239$ $p = .221$

However, a significant relationship was reported between Welsh language ability + Temporal details, $r(26) = .476$ $p = .010$, with the greater the self-reported Welsh language ability, the greater the amount of temporal details produced by liars.

For truth tellers, no significant correlation was reported between Welsh language ability + Spatial details, $r(26) = .264$ $p = .159$, Temporal details $r(26) = .227$ $p = .227$ and Fillers $r(26) = .270$ $p = .148$. A significant relationship was reported between Welsh language ability + Perceptual

details $r(26)=.432$ $p=0.17$, with the greater the self-reported Welsh language ability, the greater the amount of perceptual details produced by truth tellers.

5.6 Participant ratings

A multivariate ANOVA was conducted with condition + veracity as dependent variables and participants self-report, Comfort, Preparedness, Speed + Co-operation as dependent variables. Results revealed no significant multivariate effect of condition, $F(4,51) = 2.088$ $p=.096$, veracity, $F(4,51) = 1.097$ $p=.368$ and no significant interaction between condition + veracity, $F(4,51) = 1.223$ $p=.313$.

Table 6 - Univariate results for participant self-report ratings of comfort, preparedness, speed and co-operation.

| Variable | Condition | Veracity | Condition Veracity x |
|--------------|-----------------------------|-----------------------------|-----------------------------|
| Comfort | $F(1,54)=1.260$ $p=.267$ | $F(1,54)=.043$ $p=.836$ | $F(1,54)=3.066$ $p=0.86$ |
| Preparedness | $F(1,54)=.021$ $p=.885$ | $F(1,54)=1.369$ $p=.247$ | $F(1,54)=.056$ $p=.814$ |
| Speed | $F(1,54)=.010$ $p=.921$ | $F(1,54)=1.741$ $p=.193$ | $F(1,54)=.142$ $p=.708$ |
| Co-operation | $F(1,54)=8.442$ $p=.005$ | $F(1,54)=1.664$ $p=.203$ | $F(1,54)=1.406$ $p=.241$ |

Table 6 reports a significant result for the effect of condition upon participants' self-report rating of co-operation.

Figure 7 - Participant mean self-report ratings of co-operation for bilingual and monolingual participants

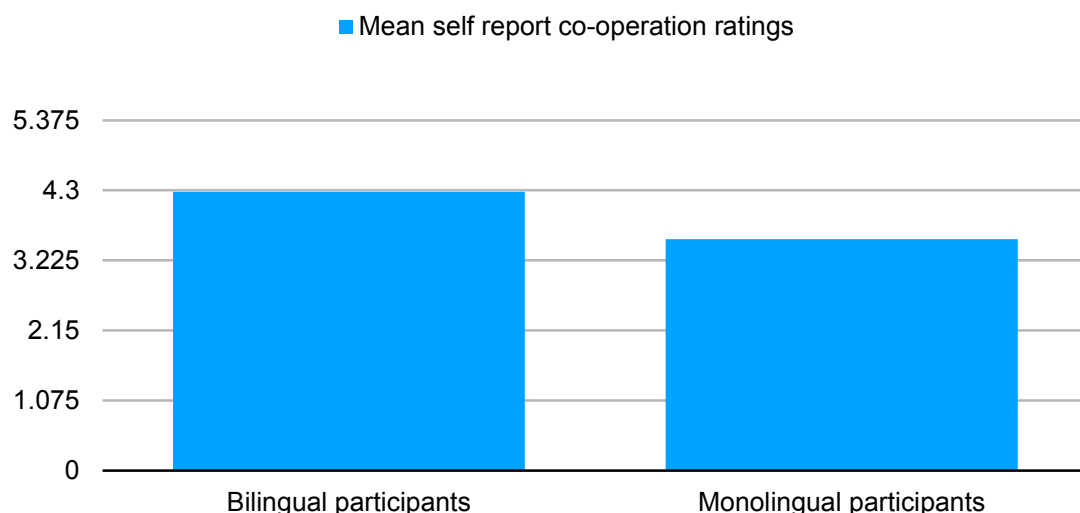


Figure 7 reports that Bilingual participants self-reported a larger amount of co-operation than monolingual participants.

Table 7 - Means and standard deviation for participants self-report ratings of comfort, preparedness, speed and co-operation.

| | Welsh speaking | | English Speaking | | Truth teller | | Liar | | Welsh Liar | | Welsh Truth teller | | English Liar | | English Truth teller | |
|------------------------|----------------|------|------------------|------|--------------|------|-------|------|------------|------|--------------------|------|--------------|------|----------------------|------|
| | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD | Me an | SD |
| Co mfo rt | 3.85 | 1.01 | 3.51 | 1.26 | 3.73 | 1.11 | 3.53 | 1.26 | 4.09 | 0.83 | 3.60 | 1.17 | 3.17 | 1.38 | 3.85 | 0.98 |
| Pre par edn ess | 3.42 | 0.97 | 3.36 | 0.94 | 3.23 | 1.04 | 3.56 | 0.82 | 3.54 | 0.82 | 3.30 | 1.15 | 3.56 | 0.85 | 3.20 | 1.00 |
| Spe ed | 3.71 | 0.84 | 3.67 | 0.85 | 3.52 | 0.85 | 3.85 | 0.80 | 3.81 | 0.75 | 3.60 | 0.96 | 3.88 | 0.85 | 3.48 | 0.82 |
| Co-ope rati on | 4.28 | 0.84 | 3.55 | 1.03 | 4.00 | 0.98 | 3.62 | 1.05 | 4.27 | 0.78 | 4.30 | 0.94 | 3.20 | 1.01 | 3.85 | 0.98 |

5.7 Interviewer ratings

A multivariate ANOVA was conducted with condition + veracity as dependent variables and Comfort, Preparedness, Speed + Co-operation as dependent variables. Results revealed a significant multivariate effect of condition $F(4,51) = 3.125$ $p=.022$. However, no significant

multivariate effect of veracity, $F(4,51) = .563$ $p=.691$ and no significant interaction between condition + veracity, $F(4,51) = 1.272$ $p=.293$ was reported.

Table 8 - Univariate results for comfort, preparedness, speed and co-operation

| Variable | Condition | Veracity | Condition Veracity x |
|--------------|------------------------------|-----------------------------|-----------------------------|
| Comfort | $F(1,54)=5.640$ $p=.021$ | $F(1,54)=.001$ $p=.982$ | $F(1,54)=.810$ $p=.372$ |
| Preparedness | $F(1,54)=4.865$ $p=.032$ | $F(1,54)=.002$ $p=.960$ | $F(1,54)=.101$ $p=.752$ |
| Speed | $F(1,54)=10.785$ $p=.002$ | $F(1,54)=.007$ $p=.933$ | $F(1,54)=5.280$ $p=.025$ |
| Co-operation | $F(1,54)=2.495$ $p=.120$ | $F(1,54)=1.845$ $p=.180$ | $F(1,54)=.103$ $p=.749$ |

Table 8 shows a significant result for the effect of condition upon interviewer self report ratings of participants appearance of comfort, preparedness and speed. It also shows a significant result for the effect of condition x veracity upon speed of answer.

Figure 8 - Mean results of condition upon participants comfort, preparedness and speed

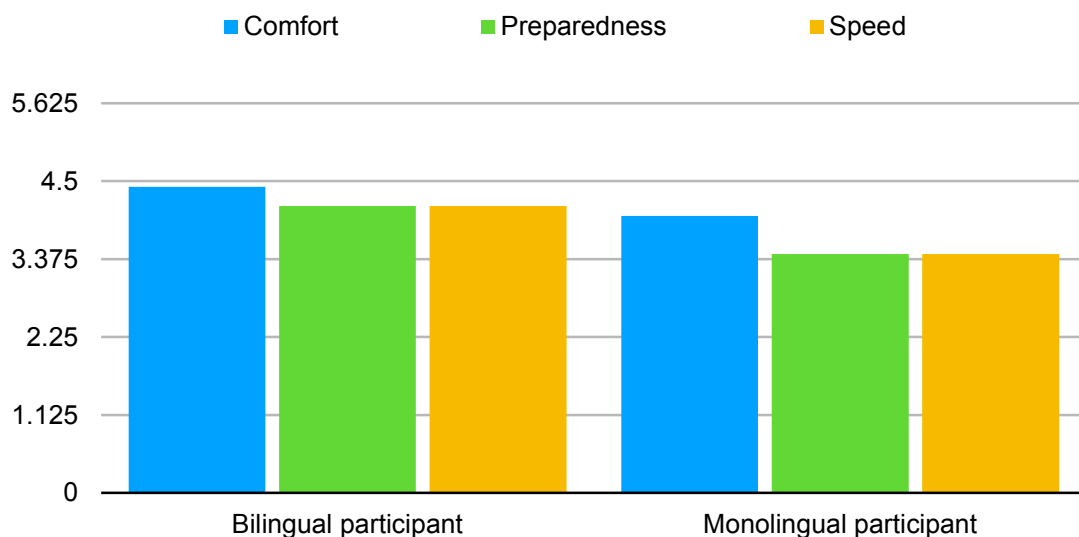


Figure 8 reports that bilingual participants appeared to have greater amounts of comfort, preparedness and speed, than monolingual participants, when answering the interview questions.

Figure 9 - significant interaction between condition x veracity for speed of answer

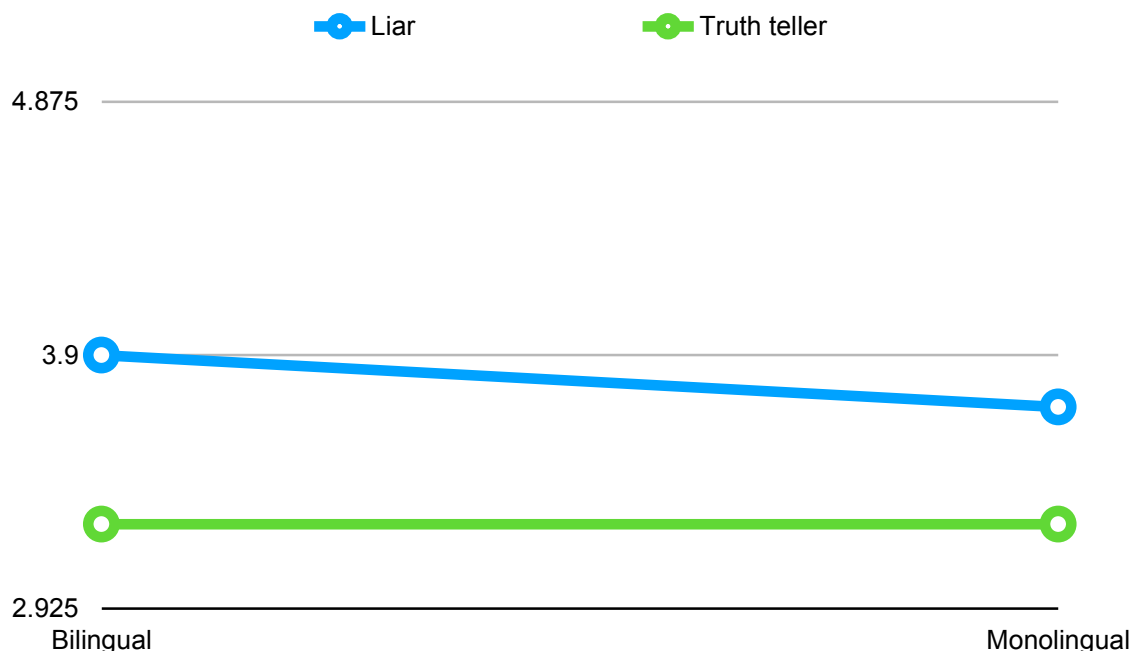


Figure 9 reports a significant interaction between condition x veracity for speed, with Welsh liars producing the quickest response and Welsh + English truth tellers responding the slowest.

Table 9 - Means and standard deviation for interviewer self report ratings of participants appearance of comfort, preparedness, speed and co-operation.

| | Welsh speaking | | English Speaking | | Truth teller | | Liar | | Welsh Liar | | Welsh Truth teller | | English Liar | | English Truth teller | |
|--|----------------|----|------------------|----|--------------|----|------|----|------------|----|--------------------|----|--------------|----|----------------------|----|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| | | | | | | | | | | | | | | | | |

| | Welsh speaking | | English Speaking | | Truth teller | | Liar | | Welsh Liar | | Welsh Truth teller | | English Liar | | English Truth teller | |
|---------------------|----------------|------|------------------|------|--------------|------|------|------|------------|------|--------------------|------|--------------|------|----------------------|------|
| Comfort | 3.66 | 1.11 | 2.97 | 1.01 | 3.16 | 1.17 | 3.28 | 1.01 | 3.54 | 1.21 | 3.80 | 1.03 | 3.11 | .85 | 2.85 | 1.13 |
| Preparedness | 4.14 | 1.10 | 3.48 | 1.09 | 3.70 | 1.11 | 3.75 | 1.10 | 4.09 | 1.04 | 3.70 | 1.11 | 3.52 | 1.12 | 3.45 | 1.09 |
| Speed | 4.14 | .65 | 3.45 | .83 | 3.63 | .96 | 3.78 | .68 | 3.90 | .70 | 3.25 | .91 | 3.70 | 0.68 | 3.25 | .91 |
| Co-operation | 4.42 | .74 | 4.03 | .92 | 4.00 | 1.01 | 4.03 | .67 | 4.54 | .68 | 4.30 | .82 | 4.24 | .66 | 3.85 | 1.08 |

5.8 Relationship between participant and interviewer ratings

Relationships between participant and interviewer ratings were conducted for how truth tellers self-reported comfort, speed, preparedness and co-operation.

No significant correlation was reported for comfort, $r(26)=.061$ $p=.747$, or speed, $r(26)=.009$ $p=.963$, between participant and interviewer ratings for truth tellers. No significant correlation was also reported for co-operation, $r(26)=.345$ $p=0.62$, between participant and interviewer ratings for truth tellers. However, co-operation is approaching significance. Finally, for preparedness to answer the question proposed, a significant correlation was reported between participant and interviewer ratings, $r(26)=.418$ $p=.022$. Therefore, truth tellers appeared and reported a greater amount of preparedness to the proposed questions.

Non-significant correlations were reported between liars' participant + interviewer ratings for comfort $r(26)=.195$ $p=.321$, preparedness $r(26)=.049$ $p=.803$ and co-operation $r(26)=.285$ $p=.142$. However, a significant result for the correlation between participant + interviewer ratings for liars' speed of answer is reported, $r(26)=.413$ $p=.029$. Therefore, liars felt and appeared to answer at a quicker pace.

6.0 Discussion

An initial manipulation check was performed to ensure that truth tellers reported a significantly greater amount of truth compared to liars. Secondly, that bilingual participants were able to speak Welsh and that English participants could not. Therefore, a significant result can be reported for the amount of truth reported by truth tellers ($F(1,54)=.35.373$ $p<.001$), with truth tellers reporting greater amounts of truth, than liars. Whilst the second manipulation test involved an independent samples t-test to ensure that bilingual participants were able to report a larger amount of Welsh speaking capabilities $t(56) = -23.195$ $p<.001$ than monolingual participants. Therefore, the participants reported following the instruction of their condition. For example, Bilingual truth tellers, reported greater ability to speak Welsh and greater amounts of truth. This is important for the efficacy of the study, because of the need to maximise differences between conditions.

The aim of this study was to suggest that liars will have an advantage within a translated interview, that employs the unanticipated question technique, if the liar has a greater understanding of the domestic language than they reveal. The underlying assumption as to how liars will have an advantage is that they have a greater amount of time within the interview, because they will have previously understood the question posed, whilst having the time within the translation of that question to reduce their cognitive load. Therefore, because of the greater planning time, they will be able to produce greater amounts of spatial, temporal and perceptual details, which current research suggests is indicative of truth telling. Therefore, in relation to the present study, the significant result for the amount of temporal details produced by bilingual participants $F(1,54)=4.716$ $p=.034$, supports hypothesis a), with bilingual participants producing greater amount of temporal details, than monolingual participants. However, non-significant results for both spatial details $F(1,54)=.742$ $p=.393$, and perceptual details $F(1,54)=1.507$ $p=.225$, do not support the hypothesis. Thus, the present study only partially supports hypothesis a) that bilingual participants will be able to produce greater amounts of spatial, temporal and perceptual details, than monolingual participants.

The second hypothesis b) states that truth tellers will produce a greater amount of spatial, temporal and perceptual details than truth tellers. However, non-significant results for the effect of veracity upon spatial $F(1,54)=.258$ $p=.614$, temporal $F(1,54)=.951$ $p=.334$, and perceptual $F(1,54)=2.781$ $p=.101$ details was reported. Therefore, the null hypothesis of hypothesis b) is accepted.

6.1 Hypotheses

The first hypothesis predicted that a) bilingual participants will produce a greater amount of temporal, spatial and perceptual details than monolingual participants. This was supported by the greater amount of temporal details produced by bilingual participants and supports the effect of temporal unanticipated questions as a technique to produce cognitive load upon the episodic buffer. However, the non-significant results for spatial and perceptual details, align with research from (Ewens, Vrij, Mann & Leal, 2015, Ewens et al., 2016) by suggesting

that the mere presence of an interpreter will reduce the amount of spatial, perceptual and temporal details produced by participants, regardless of whether an advantage exists for individuals with a greater understanding of the domestic language. Whilst this supports the amount of spatial and perceptual details produced from this study, it leaves a conflicting argument with the amount of temporal details produced by bilingual participants. However, this can be explained by a ceiling effect for the amount of cognitive load applied to participants. Trudel et al., (2017), describe the ceiling effect as the level when the independent variable no longer has an effect on the dependent variable. In relation to this study, the application of cognitive load was too great, to allow participants to produce spatial, temporal and perceptual details. In spite of this, a reduction of cognitive load for bilingual participants may have allowed them to produce greater amounts of temporal details, when paired with questions that create temporal answers. Specifically, this study's unanticipated questions, focus upon temporal detail. Which means participants will have to respond with temporal answers, if the cognitive load is not too great. Therefore, rather than the presence of an interpreter effecting the amount of details produced, it is a ceiling effect, paired with temporal questions, that may have caused the significant result for bilingual participants and temporal details.

The second hypothesis b) predicted that truth tellers will produce greater amounts of temporal, spatial and perceptual details than lying participants. The non-significant result aligns itself with recent deception research (Palena, Caso, Vrij & Orthey, 2018), in suggesting the amount of details produced by liars are inconsistent with the literature. However, rather than a weakness in the literature, the increased levels of cognitive load may have had a negative effect upon the ability of liars and truth tellers to produce temporal, spatial and perceptual details. This is supported by Ewens, Vrij, Mann & Leal, (2015), when suggesting the application of cognitive load through the reverse order technique was too mentally taxing for participants to produce temporal, spatial and perceptual details. This suggests that the application of cognitive load during interview may need to be a balance between applying enough cognitive load to create pressure, yet also not applying too great amount, so that a ceiling effect is apparent. Which is especially true when participants have to remember a large amount of script, in a short amount of time, increasing their cognitive load during planning. Therefore, further study is warranted to understand the amount of cognitive load that can be applied, before a ceiling effect is apparent.

6.2 Interviewer and participant ratings

Interviewer and participant self-report ratings led to several significant findings. Firstly, this study reported a significant result for participants' self-report rating of language upon co-operation, with bilingual participants reporting greater levels of co-operation ($M=4.28$, $SD=0.84$) than monolingual participants ($M=3.55$, $SD=1.03$). This can again be explained by the ceiling effect because of the application of cognitive load may have been too great for monolingual participants to be able to remember their script. Lin & Lin, (2016), support this by suggesting that cognitive load can have a detrimental effect upon learning, especially when learning is only delivered by a single means. Therefore, the integration of several types of planning, such as verbal rehearsal, group based planning and interactive experiences, is an important improvement upon current methodology. This is because firstly, it will reduce the application of cognitive load during learning, yet still allow for the application during interview. Secondly, it has greater levels of ecological validity, with Deep et al., (2018), suggesting liars plan meticulously and use different techniques, depending on the needs of the plan. Which does not reflect the learning of a script in this study. Therefore, allowing participants to have the time to use multiple learning/planning techniques, may decrease the application of cognitive load during the planning stage, allowing for greater ecological validity

of a liars' experience, during interview. Which in relation to this study, means an increase in the co-operation of monolingual participants, may be possible.

The next set of significant results are reported from the interviewers' self-report ratings of their perception of the participants performance. Interviewers reported that bilingual participants appeared to have greater levels of comfort ($M=3.66$, $SD=1.11$) preparedness ($M=4.14$, $SD=1.10$) and speed ($M=4.14$, $SD=.65$). In comparison to monolingual participants comfort ($M=2.97$, $SD=1.11$) preparedness ($M=3.48$, $SD=1.09$) and speed ($M=3.45$, $SD=.83$). This reflects one of the aims of the study, that bilingual participants will have an advantage over monolingual participants, because of their greater knowledge of the domestic language. However, it does not reflect either hypothesis because it does not include spatial, temporal and perceptual details. Furthermore, it does not reflect upon a specific advantage of lying during interview, because of the non-significant results for the effect of veracity upon the interviewer's perception of participants. These results are therefore aligned with current research because they suggest that humans are not particularly effective at identifying deceit (Blair, Levine & Vasquez, 2015). Therefore, the interviewer's self-report ratings of their perception of the participants' veracity upon comfort, speed and preparedness reflect current research. However, having greater knowledge of a domestic language during a translated interview, may increase the appearance of comfort, preparation and speed. This is important because Bogaard, Meijer, Vrij & Merckelbach, (2016), suggest that both civilians and police officers held stereotypical beliefs in signs of non-verbal cues to deception, including the appearance of the suspects manner. Therefore, further research should be conducted as to how great an advantage liars with a greater knowledge of the domestic language may have.

Finally, a significant correlation was reported between truth tellers' appearance and reporting of how prepared they felt, with truth tellers reporting greater levels of preparation. This reflects the extra planning time allowed before interview, compared to that of liars and is another reflection of the application of cognitive load. Kayla & Singh, (2015) support this by suggesting an appropriate amount of preparation for a task, is able to reduce the effects of cognitive load. Which in turn will leave truth tellers with the ability to appear prepared. This is important because of the assumption that cognitive load will create greater difficulties to liars because of their increase in cognitive load from lying. However, if prior planning is able to reduce the effects of cognitive load, the whole assumption of the cognitive load technique becomes questionable. Therefore, further research into the correct reproduction of a liar's planning stage, will create further clarity, as to the appropriateness of the cognitive load technique.

Secondly, a significant correlation was reported between liars' appearance and self-report of speed of answer. Liars appeared and reported to answer quicker than truth tellers. This may have been due to the nature of the unanticipated question technique. Which meant that liars would have felt naturally rushed in their answer, because they did not have time to create a credible answer to the questions, whilst also being aware of their need to answer. This is supported by Mann, Vrij, Leal, Vernham & Even, (2015), when suggesting that one of the reasons lying is a cognitively greater demanding task than truth telling, is because liars need to be conscious of their appearance of credibility. Therefore, liars may have attempted to increase their credibility by answering questions as soon as possible. Which in turn will counteract their internal anxiety of not appearing credible.

7.0 Limitations

Several limitations may have affected the results of this study. Firstly, the previously mentioned ceiling effect may have caused a decrease in the ability to lie in both Welsh and English speaking conditions. In relation to this study, the application of cognitive load may have been too great to allow for a sufficient advantage for bilingual participants to produce greater amounts of details. This is important because of the large amount of script, that participants had to learn within a short amount of time, within the experiment. Which means both, the large amount of script and the decreased amount of time, have the ability to increase cognitive load (Risko & Gilbert, 2016). Therefore, even if a participant was attempting to be truthful, the effects of cognitive load may have been too great. Furthermore, the ceiling effect may have been exasperated, due to the presence of the strategic use of evidence, as well as the Unanticipated questions, during the interview. The SUE was originally included because of a joint study with another researcher, however, it was also used in an attempt to increase the ecological validity of the interview. This is because investigators are more likely to use several deception detection methods during interview (Granhag & Hartwig, 2015).

In spite of the existence of both techniques, this study attempted to control for extraneous variables caused by the use of both techniques, through the counterbalance of the SUE and UA. This is because the presence of more than one technique, will increase the effect of cognitive load upon the participant (Blandon-Gitlin, Fenn, Masip & Yoo, 2014). Therefore, another increase in cognitive load, for all participants occurred. This is reflected in the results because of the lack of significant results for the effect of veracity upon spatial, temporal and perceptual details. However, a suggestion to negate the amount of cognitive load is to replace the learning of a script with the planning of a task. This is an advantage for several reasons, firstly, it aligns the methodology of the study with current research (Vrij, 2014, Vrij et al., 2018). Secondly, it can reduce the cognitive load, because the truth telling participant is now able to remember their plans, instead of increasing their own cognitive load through the learning of a large amount of script. Therefore, results of a ceiling effect from cognitive load (Ewens et al., 2016), along with the current study mean that the application of cognitive load in relation to deception detection, will need further research, to be able to apply the correct amount.

These suggestions may have contributed to the reasoning behind the non-significant result. However, further limitations within the methodology of the study may have further distorted the efficacy of the experiment. Firstly, the experimenters were neither professional translators, or in a profession where they would interview using the unanticipated questions technique. Which reduces the ecological validity of the experiment. Levine, (2017) suggests this is an important issue within current deception research for several reasons, including the lack of professional behaviour. This is important, because this study's use of non-

professional translators may not replicate a professional translator's behaviour. Therefore, causing a reduction of ecological validity.

Furthermore, the participants were largely recruited from the University of South Wales. Which may have increased the likelihood of co-operation from the participants, compared to a real suspect. However, due to the time constraints of the study and the unique population (bilingual participants) needed, the recruited participants were the most appropriate choice. Moreover, the motivation of the participants had to be accounted for, to ensure their motivation to fully participate within the study. Curtis, (2015), suggests participant motivation is key to ensuring that participants follow instructions. Therefore, the planning time for participants could not be too long, because of the possibility of participants losing motivation during the planning stage. This may have impacted the ecological validity of the experiment, due to Sooniste, Granhag, Stromwall, & Vrij, (2015) suggesting that liars prepare and plan, to attempt to increase their credibility during interview. This meant that the participants motivation was deemed of greater importance, than that of the replication of liars prior planning and was reflected in the results, due to the increase of cognitive load during the planning stage for all participants.

Finally, the previously mentioned lack of planning time and planning variation meant a decrease in ecological validity is apparent within the study. This is because a lack of ability to recreate the planning stage of a liars' preparation. Specific examples are suggested by Vrij et al., (2009) when suggesting liars can prepare future intentional lies in groups. Whilst, Clemens, Granhag & Stromwall, (2012), suggested a police raid upon a known Al-Qaeda member in Manchester, revealed far greater levels of planning and preparation than previously thought. This included a computer file on how to conduct combat operations, how to create a terrorist cell and strategies to behaviour during interrogation. When comparing the variation and detail of the previous examples of planning, compared to that of the current study (which reflects a large amount of the literature), then a clear loss of ecological validity is apparent. This means that the methodology of mock interviews need to apply greater attention to the recreation of the planning stage of liars, in order to understand a truer reflection of the results.

Therefore, several factors may have affected the ecological validity of the results. Firstly, the large amount of script may have increased the cognitive load during the planning stage, which in turn created a ceiling effect of the application of cognitive load. Secondly, the lack of access to professional interpreters, meant a possible reduction of the ecological validity of the interview process, because of a possible difference in this study's interpreter's behaviour. Finally, the choice of participants may have presented greater amounts of co-operation, than an actual suspect during interview. However, due to time constraints and the motivation of the individual, the chosen participants were the best available at the time. Although, the lack of ecological validity has raised questions about current methodology of the planning stage of current literature and is a possibility for future study.

8.0 Conclusion

To conclude, this study has produced greater questions over the two key areas of the current methodology. Firstly, the application of cognitive load. The ceiling effect produced by the increase of cognitive load during the planning stage has caused a decrease in the amount of spatial, temporal and perceptual details produced. This is important to the detection of deception, because the greater amount of these details is indicative of the greater amount of truth telling (Nahari, Vrij & Fisher, 2012). However, this study was only able to suggest a significant result for the effect of temporal details, which is a reflection of the ceiling effect because of the increase of cognitive load during the planning phase. Therefore, an improvement within the methodology to create greater time and variation for liars' preparation will negate the effects of cognitive load during the planning stage. This will reduce the ceiling effect of cognitive load during the planning stage. In turn, this will allow the correct application of the cognitive load technique during the interview.

Secondly, by allowing liars greater preparation time and variation, a rise in ecological validity is created. This is because liars spend a far greater time planning to increase their credibility (Giolla, Granhag & Liu-Jonsson, 2013), than is often reflected in academic research. Thus, replicating the conditions is vital, to understanding the actual behaviour of liars. This has potential repercussions for the Police and Criminal Evidence Act, (1984), because of Foerster, Wirth, Herbert, Kunde & Pfister, (2017), when they suggested that a solid alibi caused liars to become indistinguishable from truth tellers. Therefore, because of the increase in serious crime and terrorism ("Violent crime rising, police figures suggest", 2018), it is crucial for future research to focus on increasing the ecological validity of liars' preparations during the planning stage. This is so that a truer response from liars, can be achieved. Which in turn, may effect the amount of spatial, temporal and perceptual details produced by liars.

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